

REMARKS

Claims 1-10, 12-35 and 37-47 are pending, with claims 1, 18, and 30 being independent. Claims 16-29 have been withdrawn. Claims 1, 30, 43, and 45-47 have been amended. Support for these amendments can be found in the originally-filed specification, at least at page 3, lines 24-26; page 4, lines 29-31; and page 5, lines 5-10. No new matter has been introduced.

Claim Rejections - 35 U.S.C. § 103: Claims 1-10, 12-15, and 38-42

Claims 1-10, 12-15, and 38-42 have been rejected as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of U.S. Patent No. 4,381,148 (Ulrich), U.S. Patent No. 6,888,853 (Jurgensen), and U.S. Patent No. 4,817,413 (Asano). Applicant requests withdrawal of this rejection because neither AAPA, Ulrich, Jurgensen, Asano, nor any proper combination of the four describes or suggests a means for decoupling diagnostic radiation from laser radiation that is directed to a workpiece, and a measuring cell into which a portion of one or more operating gases to be analyzed can flow, where the operating gases include one or more gases of the gas atmosphere through which the laser is guided, one or more laser-processing machine gases that are used on the workpiece, and one or more supply gases for the laser, as recited in claim 1.

AAPA mentions that in a laser-processing machine including a CO₂ laser, CO₂ laser radiation can be guided through a gas atmosphere and that such CO₂ laser radiation can be absorbed by molecules. See the Specification at page 1, line 9 to page 2, line 11. However, AAPA never describes or suggests a means for decoupling diagnostic radiation from such laser radiation, or a measuring cell into which a portion of one or more operating gases to be analyzed can flow.

Realizing these deficiencies, the Examiner first cites Ulrich, arguing that Ulrich describes "use of a power meter cell disposed in the flow path of a gas species whose absorption coefficient is small enough not to disturb the beam." While the Examiner is correct that Ulrich places a cell that houses a laser radiation-absorbing gas in a flow path of a laser beam, Ulrich never describes or suggests that such a cell is placed downstream of a means for decoupling

diagnostic radiation, or that such a cell includes operating gases, as recited in claim 1. Rather, as Ulrich explains, the power meter cell is placed into the direct beam of the laser radiation, and is filled with a gas that is not an operating gas. See Ulrich at abstract. Indeed, Ulrich explicitly teaches away from the use of a decoupling means or a cell that includes operating gases because Ulrich's cell is set up to allow the beam to pass through the cell "essentially unaltered" and the concentration of the gas is modulated to give an absolute measurement of the power in the laser beam. See Ulrich at abstract.

Jurgensen does not remedy the failure of AAPA and Ulrich to describe or suggest a decoupling means or a measuring cell into which a portion of one or more operating gases to be analyzed can flow, where the operating gases include one or more gases of the gas atmosphere through which the laser is guided, one or more laser-processing machine gases that are used on the workpiece, and one or more supply gases for the laser, as recited in claim 1. In Jurgensen, "a slight part" of "modulated radiant power" can be forwarded onto a measuring cell by way of a beam splitter to generate a measured quantity for regulation of laser energy. See Jurgensen at col. 20, lines 39-65. However, Jurgensen never describes or suggests that such a measuring cell could include operating gases to be analyzed. Rather, Jurgensen merely explains that the measuring cell is used for regulation of laser energy. See Jurgensen at col. 20, lines 59-65. Moreover, one of ordinary skill in the art would not have been led to modify AAPA or Ulrich to include the beam splitter of Jurgensen because Ulrich explicitly teaches away from such decoupling. In Ulrich, the cell is set up to permit the laser beam to pass through unaltered, to enable an absolute measurement of the power. Thus, Ulrich's cell is designed to be placed in the direct path of the laser beam.

Asano does not remedy the failure of AAPA and Ulrich to describe or suggest a decoupling means or a measuring cell into which a power of one or more operating gases to be analyzed can flow, where the operating gases include one or more gases of the gas atmosphere through which the laser is guided, one or more laser-processing machine gases that are used on the workpiece, and one or more supply gases for the laser, as recited in claim 1. In Asano, there is no suggestion that the laser would be directed to a workpiece, and therefore, Asano lacks a means for decoupling diagnostic radiation from laser radiation that is directed to a workpiece. As Asano explains, the laser is ultimately directed to a laser power meter 29. See Asano at col.

4, lines 15-26 and Fig. 1. Moreover, there is no suggestion that the cells 1, 2 include one or more operating gases, where such operating gases include one or more gases of the gas atmosphere through which the laser is guided, one or more laser-processing machine gases that are used on the workpiece, and one or more supply gases for the laser, as recited in claim 1. Rather, as Asano explains, the cell can house an exhaust gas from an internal combustion engine. See Asano at col. 3, lines 6-24.

Accordingly, for at least these reasons, claim 1 is allowable over any proper combination of AAPA, Ulrich, Jurgensen, and Asano. Claims 2-10, 12-15, and 38-42 depend from claim 1, and are allowable for at least the reasons that claim 1 is allowable, and for containing allowable subject matter in their own right. For example, claim 9 recites that the laser-processing machine includes a control unit for using a rinsing gas in response to the photo-acoustical effect measured. None of the cited references describes or suggests such a control unit. As a further example, claim 10 recites that the control unit is formed for controlling the flow rate of one or more supply gases of the laser-processing machine and of working or cutting gases in response to the analysis of a gas atmosphere in feed lines of or in a laser beam path. None of the cited references describes or suggests such control. As another example, claim 38 recites that the laser-processing machine also includes a means for directing the portion of the laser-processing machine gas in the cell to flow back to the laser after it has been analyzed. None of the references describes or suggests such a directing means.

Claim Rejections—35 U.S.C. § 103; Claims 30-35, 37, and 43-47

Claims 30-35, 37, and 43-47 have been rejected as being unpatentable over AAPA in view of Ulrich, Jurgensen, and Asano. Applicant requests withdrawal of this rejection because, as discussed above, neither AAPA, Ulrich, Jurgensen, Asano, nor any proper combination of the four describes or suggests a radiation decoupler downstream of a laser and in the path of laser radiation that is directed to a workpiece, and a measuring cell into which operating gas to be analyzed flows, the measuring cell being positioned downstream of the radiation decoupler to receive the decoupled radiation and including an inlet that receives the operating gas to be analyzed from one or more of gases of the gas atmosphere through which the laser is guided, laser-processing machine gases that are used on the workpiece, and supply gases for the laser, as

recited in claim 30. Accordingly, claim 30 is allowable over any proper combination of AAPA, Ulrich, Jurgensen, and Asano.

Claims 31-35, 37, and 43-47 depend from claim 30, and are allowable for at least the reason that claim 30 is allowable, and for containing allowable subject matter in their own right. For example, claim 35 recites that the diagnostic machine also includes a control unit for using a rinsing gas in response to the photo-acoustical effect measured. None of the cited references describes or suggests such a control unit. As another example, claim 43 recites that the operating gas to be analyzed is a laser operating gas. None of the cited references describes or suggests that a laser operating gas be analyzed.

Conclusion

In conclusion, applicant submits that all claims are in condition for allowance. The fee of \$1,020.00 for the Three Month Extension of Time to and including June 4, 2007 is being paid concurrently with the Electronic Filing System (EFS). Please apply all charges or credits to deposit account 06-1050, referencing Attorney Docket No. 15540-009001.

Respectfully submitted,

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